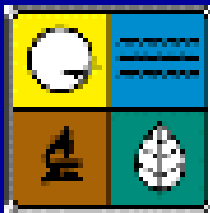


# Antidegradation: Role of Economic Analysis

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Water Protection Program  
Missouri Dept. of Natural Resources  
April, 2006

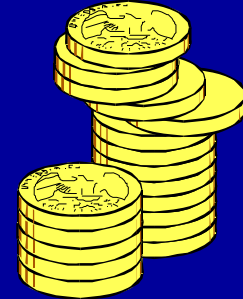


# Outlines

- Introduction
- A Summary of Chapter 5 -  
*"Interim Economic Guidance For Water Quality Standards Workbook"* U.S. EPA-823-B-95-002 March 1995  
(<http://www.epa.gov/waterscience/econ/index.html>)
- Examples



# Where in the WQS Process are Economics Considered?



- Use Attainability Analysis

- Used when removing a use “(6) Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact” [40 CFR 131.10 (g)]

- Variances

- Used when granting a variance

- Antidegradation

- The Antideg policy is intended to protect current water quality; in only a limited set of cases can economic grounds be used to allow for lowering of water quality
- Used to determine if there might be interference with an important social and economic development - where lowering water quality may result in improved social and economic conditions.



# Types of Analyses

- **Economic Impact Analysis**
  - An assessment of change in overall economic activity as a result of changes in one or several economic activities. Describes who gains and who loses. Often focuses on costs, but can include benefits.
- **Benefit Cost Analysis**
  - Measure of economic efficiency to help determine if society is better off. Often expressed as a ratio of costs and benefits.
- **Equity Assessment**
  - Estimates the impacts to subpopulations that are disadvantaged or experience disproportionate effects.



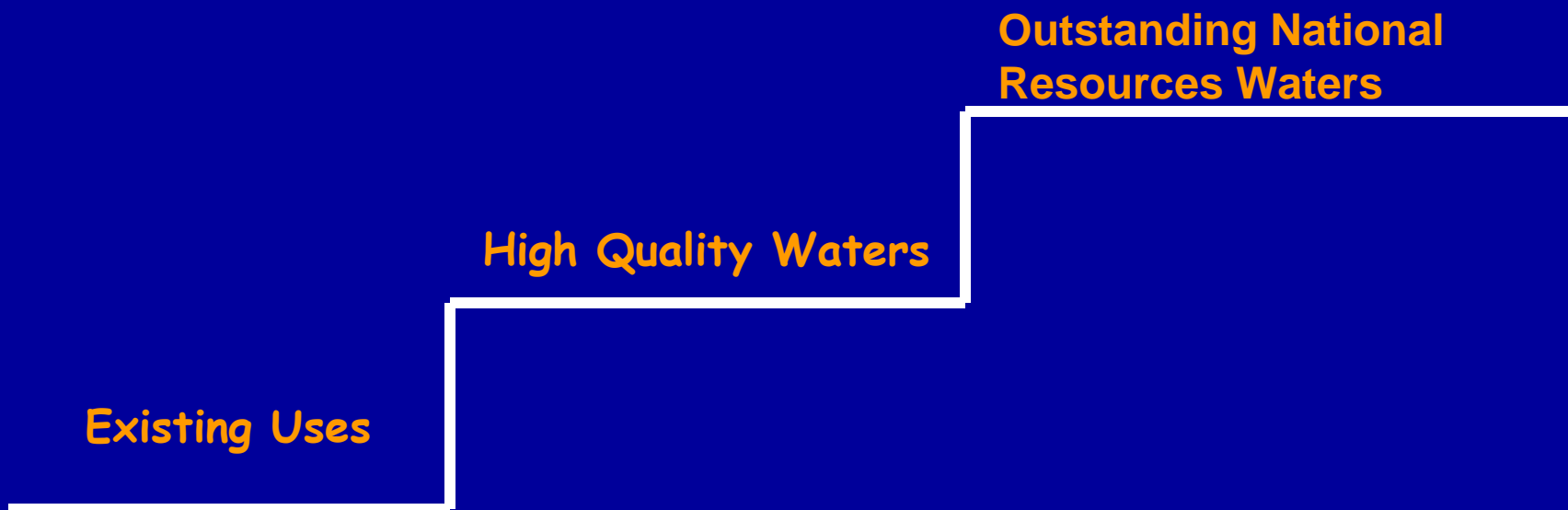
# A State/Tribal Antidegradation Policy

- Protects existing uses
- Allows water quality that exceeds “fishable/swimmable” to be lowered by regulated activities only in certain prescribed conditions and after some type of public review
- Protects waters of national significance
- The Water Quality Standards regulations provide certain minimums for these policies

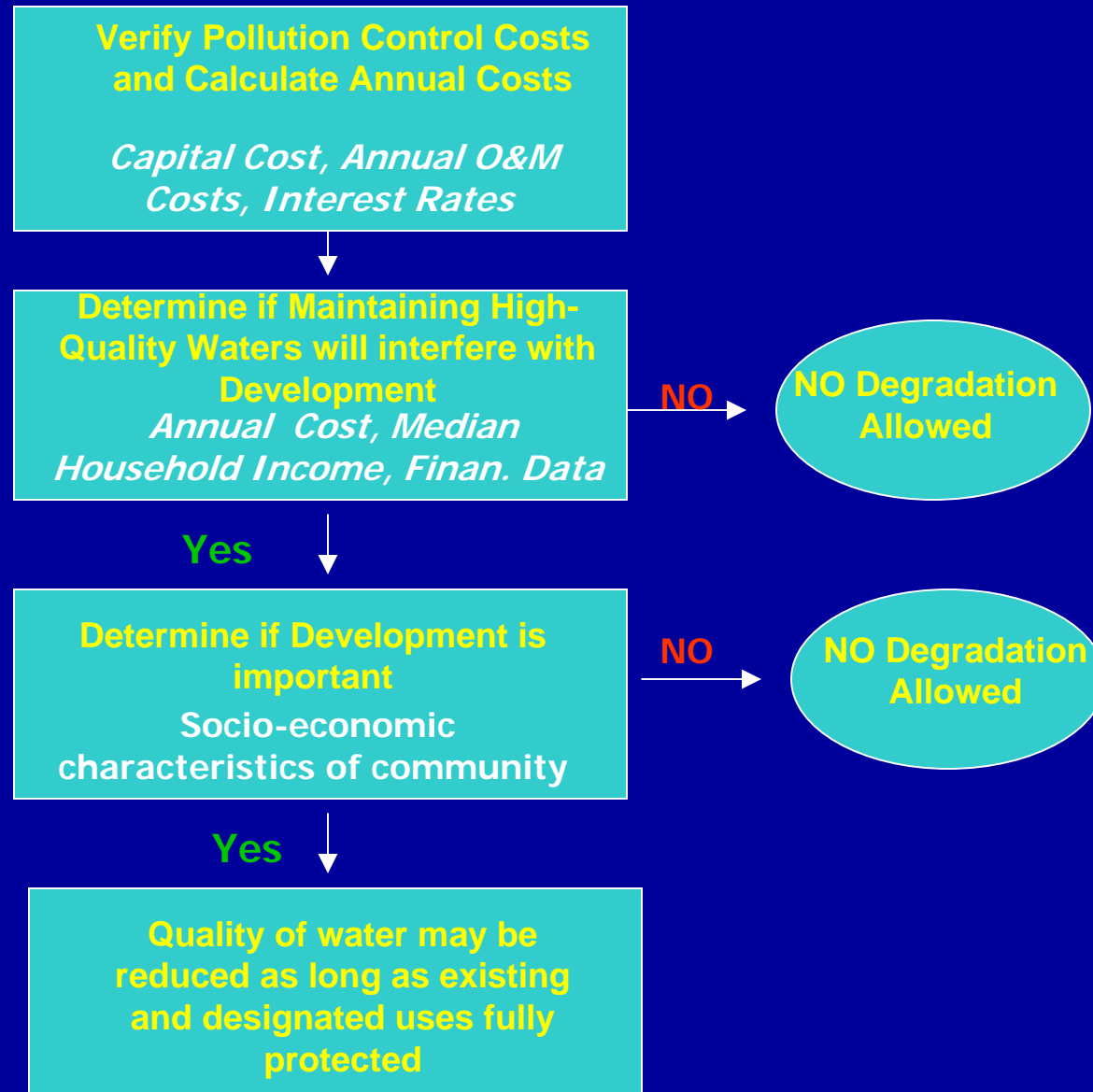


# What Are The Elements Of An Antidegradation Policy Consistent With 40 CFR 131.12 ?

Water Quality for:



# Antidegradation Review



# What Type of Entity/Applicant?

- Public Facility (Publicly owned)
- Private facility (Privately owned)



# Public Entity: Affordability for Communities

- **MUNICIPAL PRELIMINARY SCREENER (MPS)**  
**Ability to Pay, by Household**

$$\text{MPS} = \frac{\text{Avg. Annualized Project Cost per Household}}{\text{Median Household Income (MHI)}}$$

- **SECONDARY TEST**  
**Six Community Assessment Indicators**

Two Debt Indicators

Two Socioeconomic Indicators

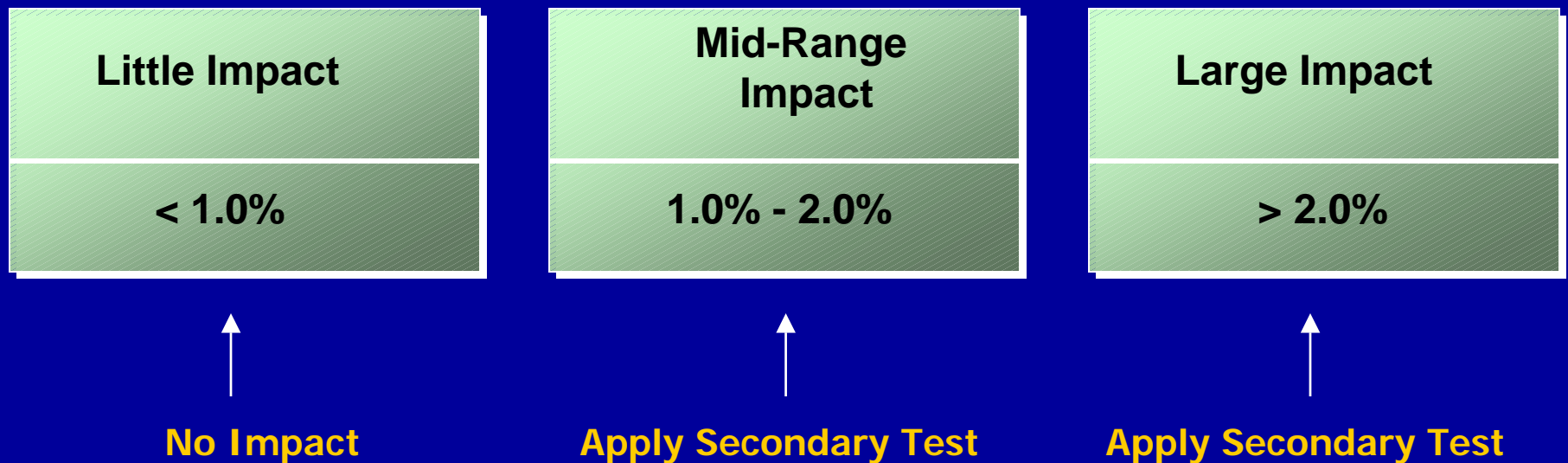
Two Financial Management Indicators



# MUNICIPAL PRELIMINARY SCREENER (MPS)

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Used to Evaluate Potential for Impacts to Households



# Secondary Test For Public Entity

1. Bond Rating: Measures of Credit Worthiness of a Community
2. Overall Debt as % of Taxable Property
3. Unemployment Rate
4. Median Household Income
5. Property Tax Revenue as % of Property Value
6. Property Tax Collection Rate



# SECONDARY TEST METHOD OF ASSESSMENT

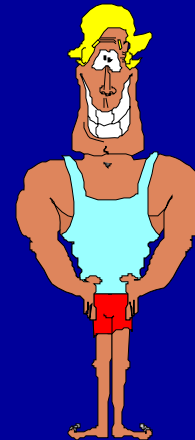
For each measure, assign score, where



Weak = 1



Mid-  
Range = 2



Strong = 3

Cumulative Secondary Test Score equals the Average of these scores.



# Secondary Indicators

<i><b>Indicators</b></i>	<i><b>Weak</b></i>	<i><b>Mid-Range</b></i>	<i><b>Strong</b></i>
<i><b>Bond rating</b></i> (rating agencies – e.g. Moody's & Standard & Poor's Corp.)	Below	Equal	Above
<i><b>Overall Debt as % of FMV of taxable P.</b></i>	Above 5%	2% - 5%	Below 2%
<i><b>Unemployment rate</b></i>	Above National Average	Equal National Average	Below National Average
<i><b>Median H Income</b></i>	Below State MH Income	Equal State MH Income	Above State MH Income
<i><b>Property tax Revenue as % of FMV of Taxable Pro.</b></i>	Above 4%	2% - 4%	Below 2%
<i><b>Property tax Collection Rate</b></i>	< 94%	94%-98%	>98%



# CUMULATIVE SECONDARY TEST ASSESSMENT

**Average the Scores of All Measures**

Weak	Mid-Range	Strong
< 1.5	1.5 - 2.5	> 2.5

**For Example:  $1 + 2 + 1 + 3 + 2 + 3 = 12$**

$$12/6 = 2$$

**Community Falls within Mid-Range**



# ASSESSMENT OF IMPACTS MATRIX

Secondary Assessment Score	Municipal Preliminary Screener (MPS)		
	< 1.0 %	1.0 % - 2.0 %	> 2%
< 1.5	?	+	+
1.5- 2.5	✓	?	+
> 2.5	✓	✓	?

?

= Questionable affordability

✓

= Community can afford the pollution control

+

= Community cannot afford the pollution control



Missouri DNR

# Assessment of Impacts Matrix (IM)

Utilizes the MPS and the  
Secondary Score

Note:     - the IM is not always  
              easy to interpret  
              - time to call an expert !?



# Private Entity: What happens to discharger's earnings if it is required to maintain high-water quality?

- **Primary Measure:** The Profit Test

Calculate with and without the cost of pollution control

$$\text{Profit Rate} = \frac{\text{Earnings}}{\text{Revenues}}$$

- **Secondary Measures:** *3 Financial Health Indicators*

1. **Liquidity** - How easily the Entity can pay its Short-Term bills
2. **Solvency** - How easily the Entity can pay its fixed and Long-Term bills
3. **Leverage** - How much money the Entity can borrow



# The Profit Test

Compare the profit rate with and without the cost of pollution control

Negative impact	No change	Positive impact
Reduced	No impact	Increased

↑  
Secondary Measures

↑  
Secondary Measures

↑  
No Impact



# Secondary Measures For Private Entity

**1. Liquidity** - How easily the Entity can pay its Short-Term bills.  
One measure is the Current Ratio

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

**2. Solvency** - How easily the Entity can pay its Fixed and long-term bills. One Solvency test, the Beaver's Ratio

$$\text{Beaver's Ratio} = \frac{\text{Cash Flow}}{\text{Total Debt}}$$

**3. Leverage** - How much money the entity can borrow  
One commonly used measure is

$$\text{Debt/Equity Ratio} = \frac{\text{long-Term Liability}}{\text{Owners' Equity}}$$



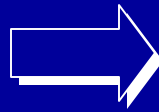
# ASSESSMENT OF IMPACTS MATRIX

	The Financial Impact Summary		
	Negative Impact	Not Clear	Positive Impact
<b><i>Profit Test</i></b>	Reduced	No Change	Increased
<b><i>Current Ratio</i></b>	$< 2$	$= 2$	$> 2$
<b><i>Beaver's Ratio</i></b>	$< 0.15$	$0.15 - 0.2$	$> 0.2$
<b><i>Debt/Equity Ratio</i></b>	Unfavorably with others		Favorably with others



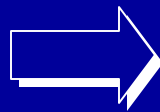
# ANNUALIZED POLLUTION CONTROL COSTS

**Capital  
(or investment  
cost)**



Spread  
over time

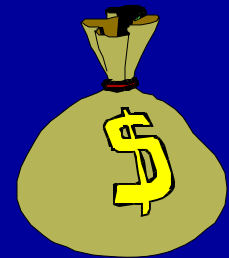
**Operation &  
Maintenance  
Costs**



Annually  
Recurring



**Totally  
Annualized  
Cost**



# Example 1 : A Public WWTP XYZ

New annual Capital Cost = \$96,342.29  
New Annual O & M = \$40,000.00  
Total annual cost = \$136,342.29

Number of the Households = 1,000

Current annual costs/Household = \$420.00  
New annual costs/Household = \$136.34  
Total annual costs/Household = \$556.34

Median Household Income (MHI) = \$35,000



## Where Municipal Preliminary Screener Test

$$\begin{aligned} \text{MPS} &= \frac{\$ 556.34}{\$35,000} \\ &= 1.6\% \end{aligned}$$

Because the MPS > 1%

Need to Apply the Secondary Test



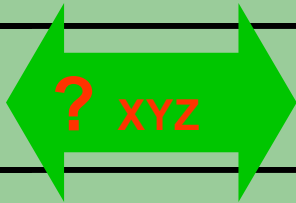
## Assume:

1. Mid-range Bond Rating > score 2
2. Mid-range Overall Debt as % of Property Value > score 2
3. Mid-Range Unemployment Rate Indicator > score 2
4. Weak Median Household Income Indicator > score 1
5. Mid-Range Property Tax Revenue as % of Property Value Indicator > score 2
6. Strong Property Tax collection Rate > score 3

The Average score =  $12/6 = 2$



# Using IMPACTS MATRIX for the Public Entity XYZ

Secondary Assessment Score	Municipal Preliminary Screener (MPS)		
	< 1.0 %	1.0 % - 2.0 %	> 2%
< 1.5	?	+	+
1.5- 2.5	✓		+
> 2.5	✓	✓	?

?

= Questionable affordability

✓

= Community can afford the pollution control

+

= Community cannot afford the pollution control



Missouri DNR

# Determine the potential Change: More Socioeconomic Indicator

Indicators	Before	After
Community Median Household Income		
Community Unemployment rate		
% of Household below poverty Line		
Impact on property Values		
Community Total tax revenue		
Expenditure on Social services		



## Example 2 : A Private WWTP ABC

**New annual Capital Cost = \$196,342.29**

**New Annual O & M = \$140,000.00**

**Total annual cost = \$336,342.29**

**Number of the Households = 2,000**

**Current annual costs/Household = \$480.00**

**New annual costs/Household = \$168.34**

**Total annual costs/Household = \$648.34**



Where Primary Measure: Profit Test  
without the cost of pollution control

$$\text{Profit Rate} = \frac{\$ 200,000}{\$960,000} = 20\%$$

with the cost of pollution control

$$\text{Profit Rate} = \frac{\$ 150,000}{\$1,296,000} = 12\%$$

Need to apply the Secondary Measures & more



# For the Secondary Measures

Assume:

1. Liquidity: Current Ratio is  $< 2$
2. Solvency: Beaver's Ratio  $< 0.15$
3. Leverage: Debt/Equity  $< \text{unfavorably with other}$

Need to examine the Socioeconomic indicator of the affected community



# Is it Important to the Community: More Socioeconomic Indicator

Indicators	Before	After
Total number of New jobs in the community		
Personal Income in the Community		
% of Household below poverty Line		
Impact on property Values		
Community Total tax revenue		
Expenditure on Social services		



# A Private Industry - Not a Wastewater Treatment plant

- A Meat Processing Plant
- Its estimated regional benefits:
  - Employment: 766 jobs
  - Income: \$15,336,100
  - Total output (sales): \$43,377,400

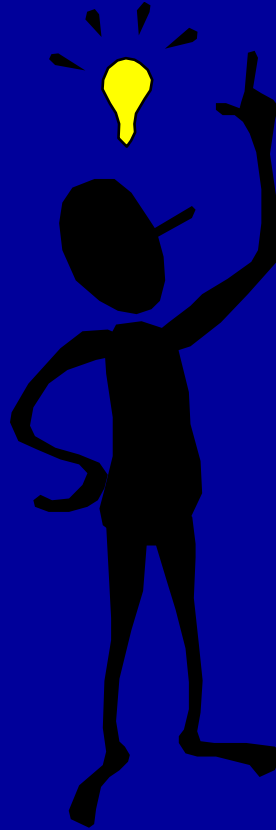


# Economic Impact Analysis

- **What happens to the industry earnings?**
  - Primary Measure: The Profit Test
  - Secondary Measures: *3 Financial Health Indicators*  
1. Liquidity - 2. Solvency - 3. Leverage
- **What happens to the affected Community?  
the region? the state? the nation?**
  - Need to examine the Socioeconomic indicators of the affected community



# That's it. Questions?



# CONTACT INFORMATION

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